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# Job mobility and wage mobility of high- and low-paid workers

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## Abstract

Studies have shown that voluntary job-to-job changes have a positive effect on wage growth. This paper argues that the impact of a job change on wage mobility depends on the position in the wage distribution. Using panel data from the UK and Germany, we show that a change of employer results into a wage increase only for the low paid workers. Within-firm job changes produce, on the average, moderate wage gains for the low-paid workers in Britain, but have no effect in Germany.

**Keywords:** low pay, high pay, job mobility, wage mobility.

**JEL-code:** J31, J62.

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## 1 Introduction

Job mobility is an important determinant of lifetime wage growth. Topel and Ward (1992) suggest that job mobility accounts for one third of the overall wage growth in the early stages of the working career. Numerous studies have examined further this relationship. In these studies, the effect of job mobility on wage growth is presumed to be independent from the position in the wage distribution. However, the decision of a worker to change job depends crucially on the level of the initial wage. Explaining individual decisions on job turnover, on-the-job search theory suggests that both the hazard rate of leaving the current job, and the difference between the current wage and the reservation wage<sup>1</sup> are decreasing with the current wage (Mortensen, 1986; van den Berg, 1992). A low-paid worker expects more job changes in his working life than a high-paid worker in order to improve his earnings. Therefore, compared to a high-paid worker, a low-paid worker chooses a reservation wage that is relatively higher than the current wage (van den Berg, 1992). In this way, the low-paid worker reduces the costs related to the job-change, as he can attain his preferred life-time earning level in fewer steps. Should workers receive wage offers relatively close to their reservation wage, then the wage gains from a job change are relatively higher for the low-paid than for the high-paid worker.

The wage effects of the different types of job change (within the firm or with another employer) have received little attention in economic research. According to various theories, wage careers within firms deviate from the assumptions of the fully competitive labour market model. Employers in large firms often pay a wage exceeding the market wage, in order to maintain the most productive workers to the firm. Therefore, we expect positive returns to job changes in the internal labor market. However, since high-paid workers are more involved in training (and therefore develop more firm-specific skills) they are expected to derive more utility from a promotion or a job shift within the same firm, than low-paid workers.

The aim of this paper is to compare the effect of voluntary job mobility on wage growth for the low- and the high-paid worker, accounting for the different mechanisms driving these two groups

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<sup>1</sup>The reservation wage refers to the lowest wage that the worker accepts in order to leave his current job.

to change job. From a policy perspective, this is an important issue since the demand for low-skilled or low-paid employment has considerably decreased over the past decades (Acemoglu, 2003). Moreover, the creation of jobs of a given quality and earnings level (i.e. high-level jobs) is contended to be a significant policy tool to tackle earnings inequality within modern European labour markets (Salverda et al., 2001).

The data we use come from two countries with very different labour market conditions: the UK and Germany. We are able, thereby, to investigate our research question in two different labour markets, a liberal and regulated one. Our econometric model is a panel regression model with a Heckman type two-step estimation procedure in order to tackle the endogeneity of job mobility.

The rest of the paper is organized as follows. Section 2 presents shortly the findings of the relevant literature. The data are discussed in Section 3. The model used for estimation is developed and explained in Section 4. Section 5 reports on the results from estimation of this model. Section 6 concludes.

## **2 Previous empirical findings**

Various theoretical models have tried to explain the relationship between job mobility and wage growth. The mover-stayer model (Blumen et al., 1955) suggests that “bad” workers tend to change jobs, and therefore, job mobility has a negative effect on wages. The job-search model (Mortensen, 1986) argues instead that a separation has a positive effect on wages. This happens because the separation takes place when the worker encounters a better wage offer. In both models, the productivity of the workers is fixed and known ex-ante. Therefore, these two models suggest that controlling for individual and job heterogeneity should eliminate the effect of job mobility on wages. The job-matching model relaxes the assumption of ex-ante known productivity. It suggests that wages are adjusted within a job, as information about the quality of the match is revealed. A separation can be the result of such an adjustment. The “raiding” model of Lazear (1986) suggests that current wages serve as a proxy for workers’ productivity. Since productivity is not known ex-ante, the job-matching and the “raiding” model allow for an effect of job mobility

on wages even after controlling for individual and job heterogeneity.

With respect to this feature, empirical findings are more in accordance with the predictions from the job-matching and the “raiding” model (Light and McGarry, 1998; Munasinghe and Sigman, 2004). Voluntary changes of employer are found to produce wage gains in the US (Royalty, 1998; Gladden and Taber, 2000) and in Europe (Perez and Sanz, 2005). However, these gains decrease with age as well as with tenure, and with the number of job changes (Farber, 1994; Light and McGarry, 1998).

The effect of within-firm job changes on wage growth has received less attention in economics, whereas within-firm mobility is found to account for a considerable part of the life cycle earnings variation (McCue, 1996). Only few studies, such as Lazaer (1999) argue that promotions have an immediate positive effect on wages. Hannan et al. (1990) find that within-firm job mobility does not result into faster wage growth for West-German workers, while Baker et al. (1994) find that the wage premium of an in-firm promotion in the US is significantly less than the average wage disparity between the same job positions.

However, these studies only estimate an average wage effect. To our knowledge, no study has ever differentiated the effect of a job change on wages between the different parts of the wage distribution. Such differences, as we argued above are likely to exist.

### **3 Data and main concepts**

We use data from the UK and Germany covering the period 1991-2004: the British Household Panel Survey (BHPS) and the German Socio-economic Panel (GSOEP).<sup>2</sup> These two countries are included in the analysis as their labour markets differ considerably with respect to the institutions affecting job mobility and wage growth. Efficiency in the liberal British labour market is sought through increased rates of job mobility and low levels of state intervention. On the contrary, the German labour market is featured by a high level of job protection and regulation. Jobs require

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<sup>2</sup>The BHPS data (Taylor et al., 2006) were made available by the Data Archive at Essex University. The GSOEP (Wagner et al., 1993) was provided by the German Institute for Economic Research. We only use data for the former West Germany as the labour market of East Germany differed considerably from the West German one, especially at the beginning of the 1990s.

certain qualifications provided by education or vocational training (apprenticeship). Collective bargaining covers about 70% of the West-German workers in the private sector. The relevant fraction for the UK is only 22%.<sup>3</sup> Moreover, the macroeconomic performance of the two countries shows considerable variation since the early 1990s. The UK economy was engaged in a much stronger economic upturn than the German economy, which had to face the costs of reunification. This is reflected in higher GDP growth rates, lower unemployment rates and higher average wage growth in the UK compared to Germany.

The sample is restricted to full-time working males between 25 and 55 years of age. Specifically, we select males that declared paid employment to be their main activity and that work at least 35 hours a week. We excluded the self-employed and the apprentices. Our main economic variable is the gross hourly wage.<sup>4</sup> This hourly wage is calculated from the last month's earnings from paid employment, and the usual number of hours worked per week. Monthly pay includes overtime but no other kind of additional payments.<sup>5</sup> We define as low- and high-paid workers those belonging to the lowest and the highest quartile of the wage distribution, respectively.

Following similar approaches in the literature (Perez and Sanz, 2005), we define as voluntary, the job changes that are direct, without an intervening unemployment or inactivity spell. Since our focus is on voluntary separations, involuntary job changes are excluded from the analysis.

## 4 Empirical model

When investigating the effect of job mobility on wage growth, the main econometric issue to be tackled is the possible endogeneity of job mobility. We apply a two-step procedure of the Heckman type to correct for this possible endogeneity: first, we model the probability of job mobility; second, we estimate a wage regression that includes the correction terms for endogeneity derived from the first step.

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<sup>3</sup>These percentages refer to 2000 and come from the European Industrial Relations Observatory (EIRO).

<sup>4</sup>Unfortunately, these panel surveys offer no information on the reservation wage. Therefore, we rest on the assumption that the workers accept job offers with a wage close to their reservation wage.

<sup>5</sup>Including additional payments (bonus, fringe benefits) would be definitely informative since the high paid might receive more of these payments than the low paid. However, in GSOEP information on this payments is only available in a yearly basis and therefore it does not necessarily refer to the current job.

In the first step, we apply a random-effects panel multinomial logit model for job mobility, distinguishing between no job change, external (between-firms) job change and internal (within-firm) job change. Non-pay related components of job satisfaction are used as the exclusive variables that allow the identification of the model. For the UK, we use the satisfaction for working hours and for the work content. For Germany, we use the variable indicating how much the worker is worried about job security.<sup>6</sup> The model also controls for a number of observed characteristics (see note in Table 2). Parameters are estimated by maximum likelihood using LatentGold (Vermunt and Magidson, 2005).<sup>7</sup> From this first-step estimation, we retrieve selection terms (control functions) in a way analogous to the Heckman selection model (Heckman 1979). We have one such term to control for the endogeneity of an external job change ( $\lambda_1$ ), and one to control for the endogeneity of an internal job change ( $\lambda_2$ ). The control functions are defined as proposed by Dubin and McFadden (1984).

The second step of the estimation procedure is a fixed-effects linear wage-growth regression, where we correct for the endogeneity of job mobility.<sup>8</sup> This wage regression model can be written as:

$$w_{it+1} - w_{it} = \mathbf{x}'_{it}\beta + \sum_{j=0}^2 p'_{ijt} \left( b_j + \sum_{k=0}^2 (d'_{ik(t+1)} c_{jk}) \right) + \lambda_{1it}\delta'_1 + \lambda_{2it}\delta'_2 + u_i + \varepsilon_{it} . \quad (1)$$

where  $w_{it}$  is the natural logarithm of the wage of individual  $i$  at time period  $t$ ,  $\mathbf{x}_{it}$  is a vector of covariates (see note in Table 2).  $p'_{ijt}$  represents the position in the wage distribution, and can take three values (low, middle, high). The categorical variable for the job change appears in the equation as dummies ( $d'_{ik(t+1)}$ ) indicating whether no change, an external or an internal job change within the firm takes place between  $t$  and  $t + 1$ .<sup>9</sup> To capture the differentiating effect of the job change in the various parts of the wage distribution, we interact the dummies for the

<sup>6</sup>We also tested other instruments, such as the housing tenure status, and the overall satisfaction with the job. The results we obtained were similar.

<sup>7</sup>Details on the estimation can be provided on request.

<sup>8</sup>In the two steps of the estimation we use different panel models. This is because there is no way of estimating a fixed-effects multinomial logit model. Moreover, in the primary equation the Hausman test rejects the null assumption of the joint coefficients' equality of the fixed- and random-effects model, suggesting that the fixed effects specification should be preferred.

<sup>9</sup>If we restrict  $p_{0k} = p_{1k} = p_{2k} = 0$ , then we get a simpler model, where the effect of job change is considered independent of the position in the wage distribution.



job change with the dummies for the position in the distribution. For identification, we assume that  $b_0 = 0$  and  $c_{j0} = 0$ . The term  $u_i$  represents the individual-specific unobserved effects and  $\varepsilon_{it}$  the idiosyncratic error. The term  $\varepsilon_{it}$  is assumed to be normally distributed with mean 0 and uncorrelated with  $u_i$ . The vector  $\beta$  and the scalars  $b_j$ ,  $c_{jk}$ ,  $\delta'_1$  and  $\delta'_2$  are the regression parameters to be estimated.

## 5 Results

Table 1 presents the fraction of job movers as well as the relative wage growth between  $t$  and  $t+1$  averaged over the years, with a breakdown according to the initial position in the wage distribution. It shows that the rates of job mobility and the corresponding wage returns are higher in the liberal British labour market than in the regulated German labour market. Furthermore, Table 1 indicates that in both countries, the low paid tend to change employer more often than the high paid, while the high paid change jobs within the firm more often than the low paid. The average relative gain for the low paid, in terms of year-to-year wage growth, is larger than for the high paid. On average, high-paid workers do not experience any significant relative change in their wage.

[Insert Table 1 about here]

Table 2 shows the main results of the first-step regression for job mobility. The main finding is that the probability of changing a job appears to vary across the different parts of the wage distribution only in the UK. We find that the higher the position in the distribution the lower the probability of changing employer. The probability of an internal job change is higher for the middle than for the upper or the lower part of the wage distribution. Our exclusive variables (satisfaction for working hours and satisfaction with work content in the UK and worry for job security in Germany) are strongly significant for external mobility. These variables have also the expected effect: the more satisfied a worker is, the lower the probability of changing employer.<sup>10</sup>

Correction for unobserved heterogeneity appears to be important in both countries: unobserved

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<sup>10</sup>In Table 2, for the UK, we present only the results for working hours satisfaction. The results for work content satisfaction in the UK are similar. Results for this variable as well as for the other covariates are omitted from Table 2. The full results can be obtained from the first author. Despite the lack of significance for the in-firm mobility equation, additional tests on the wage equation confirmed the adequacy of the instruments.

individual characteristics such as ability and search effort affect the likelihood of a job change.

[Insert Table 2 about here]

In the second step, we estimated four versions of the wage regression (Table 3): 1) a simple fixed-effects regression; 2) a fixed-effects model correcting for the endogeneity of job mobility; 3) a fixed-effects model controlling for the position in the wage distribution; and 4) a fixed-effects model controlling for both the position in the wage distribution and endogeneity of job mobility.<sup>11</sup> For both countries, models 1 and 2 perform rather weakly. The coefficients of the endogeneity correction terms are significant in model 2, which verifies the findings of previous studies. However, the endogeneity terms become insignificant in model 4 that corrects for the position in the wage distribution. Thus, our findings suggest that the endogeneity of job mobility in the wage equation is correlated with the position in the wage distribution. According to the aforementioned results, the discussion on the estimated results is based on model 3 for both countries.

[Insert Table 3 about here]

Table 3 verifies that the low-paid workers experience, on average, a higher relative wage growth than the high-paid workers, regardless of whether they change jobs or not.<sup>12</sup> Moreover, the effect of a job change on the wage growth is different between these two groups of workers. The relevant interactions terms are constructed in such a way that they can be interpreted in terms of the difference in the wage return between the relevant groups of movers and stayers. These interaction terms indicate that when changing employers, the low-paid workers experience wage gains, while their higher-paid colleagues have the same wage growth as those staying in the same job. This difference between the low- and the high-paid workers is similar in the UK and in Germany.

Within-firm mobility produces gains only for the British low-paid workers. This finding is not surprising, as within-firm job changes do not necessarily refer to promotions. They also include

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<sup>11</sup>In the models that correct for endogeneity (models 2 and 4) we bootstrapped the standard errors. This is because the regression includes predictions from the first-step regression, which could bias the standard errors.

<sup>12</sup>This result should not be interpreted as an indication of decreasing earnings inequality, which would contradict the findings of several studies. This is due to the fact that we only observe part of the overall wage mobility, as we exclude workers moving in and out of paid employment.

job changes at the same level and demotion.<sup>13</sup> Furthermore, as indicated by Baker et al. (1994), a wage gain from a job promotion may be shifted more into the future. Additional computations on our data showed that wage gains for high-paid workers several years after the job change are indeed larger than the immediate gains.

## 6 Conclusion

Most studies on the effect of job mobility on wage growth implicitly assume that this effect is the same at all wage levels. Using panel data for the UK and Germany, we showed that the probability of a job change is different for the low- and the high-paid worker in the UK, and that the relative wage returns to job changes are higher for the low-paid worker in both countries. The latter finding is in accordance with the predictions of on-the-job search theory (van den Berg, 1992). From a policy perspective, a voluntary change of employer might be a good career move for the low-paid worker.

Our study also verifies the ambiguity of the wage effect of internal job changes. In the liberal UK labour market, the low-paid worker can benefit by changing job within the firm. However, no effect is found in the regulated German labour market. It requires more scrutiny to disentangle the dissimilar effect of the various types of job changes on wage growth.

Further research could also shed more light on the alternative explanations of why people change jobs. This is particularly important for the high-paid workers. Our study suggests that changing job does not, on average, result in higher hourly wages for this group of workers. These workers are likely to benefit more often from bonus payments that are payed on a yearly basis, or from other forms of fringe benefits.

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<sup>13</sup>For the UK, two thirds of internal job changes refer to promotions. For Germany, we cannot distinguish promotions from other types of internal job changes.

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## Tables

**Table 1: Proportion of job movers and stayers, and associated relative wage growth**  
(in percentages)

		UK			Germany		
		Stayers	Movers		Stayers	Movers	
			External	In-firm		External	In-firm
<b>Low paid</b>	proportion	80.2	10.8	9.0	92.0	6.8	1.2
	wage change	13	27	24	12	14	14
<b>Medium paid</b>	proportion	80.1	7.3	12.6	93.4	4.6	2.0
	wage change	5	8	10	4	6	8
<b>High paid</b>	proportion	78.4	6.3	15.2	92.3	4.7	3.1
	wage change	0	1	3	1	2	1
<b>Total</b>	proportion	79.8	8.0	12.3	92.8	5.2	2.1
	wage change	6	13	11	5	7	6
	cases	12,968	1,300	1,999	11,404	639	258

A worker is low paid when his earnings belong to the lowest quartile of the hourly wage distribution and high paid when his earnings belong to the upper quartile of the wage distribution. The worker is middle paid if his earnings are in the second or third quartile of the distribution.

**Table 2: First step regression**  
**Random effects multinomial logit model for the job change** (robust standard error)

		UK		Germany	
		External movers	Internal movers	External movers	Internal movers
<b>Hours satisfaction</b> (reference category 1 - not satisfied at all)	<b>value 2</b>	<b>-0.170</b> (0.229)	<b>0.025</b> (0.214)		
	<b>value 3</b>	<b>-0.265</b> (0.200)	<b>-0.044</b> (0.186)		
	<b>value 4</b> (neutral)	<b>-0.410**</b> (0.202)	<b>0.076</b> (0.186)		
	<b>value 5</b>	<b>-0.499***</b> (0.196)	<b>0.128</b> (0.181)		
	<b>value 6</b>	<b>-0.484***</b> (0.195)	<b>0.057</b> (0.181)		
	<b>value 7</b> (completely satisfied)	<b>-0.713***</b> (0.219)	<b>0.204</b> (0.192)		
<b>Worry about job security</b> (very concerned)	<b>Somewhat concerned</b>			<b>-0.533***</b> (0.107)	<b>-0.062</b> (0.236)
	<b>Not concerned at all</b>			<b>-0.710***</b> (0.111)	<b>-0.190</b> (0.240)
<b>Position in the distribution</b> (low paid)	<b>medium paid</b>	<b>-0.195**</b> (0.086)	<b>0.159**</b> (0.073)	<b>0.000</b> (0.087)	<b>-0.077</b> (0.191)
	<b>high paid</b>	<b>-0.313***</b> (0.117)	<b>0.012</b> (0.091)	<b>0.033</b> (0.129)	<b>0.248</b> (0.239)
<b>Constant</b>		<b>0.426</b> (0.967)	<b>-2.208***</b> (0.753)	<b>0.499</b> (1.068)	<b>-5.783***</b> (2.069)
<b>Random effect</b>		<b>0.911***</b> (0.068)	<b>-0.686***</b> (0.050)	<b>-0.536***</b> (0.094)	<b>1.605***</b> (0.127)
<b>Log likelihood</b>		-11,397.50		-5,281.75	

Reference categories in brackets

The following variables are included as controls in the regression: a dummy for married, age in years, age squared, labour market experience in months, experience squared, education with respect to high school (low,high-school, tertiary), a dummy for formal training the past year, the industry sector (sic level 1), the firm size (small, medium and large firms), the type of contract (permanent/temporary), tenure in months, yearly dummies, and the regional unemployment rate. For Germany, we also included a dummy indicating whether the worker has ever acquired apprenticeship qualifications.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 3: Second step regression**  
**Fixed effects model for wage growth**  
(robust standard error)

	UK				Germany			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
<b>Mills ratios</b>								
Mills ratio for external job change		<b>0.042***</b> (0.007)		<b>0.002</b> (0.007)		<b>-0.018***</b> (0.004)		<b>-0.004</b> (0.004)
Mills ratio for in-firm job change		<b>-0.114***</b> (0.010)		<b>0.001</b> (0.008)		<b>-0.023***</b> (0.003)		<b>0.002</b> (0.003)
<b>Position in the distribution (low paid)</b>								
Medium paid			<b>-0.260***</b> (0.007)	<b>-0.259**</b> (0.008)			<b>-0.217***</b> (0.005)	<b>-0.217***</b> (0.005)
High paid			<b>-0.521***</b> (0.010)	<b>-0.520**</b> (0.012)			<b>-0.441***</b> (0.007)	<b>-0.439***</b> (0.009)
<b>Job change (no change)</b>								
External job change	<b>0.031***</b> (0.008)	<b>0.018*</b> (0.010)			<b>0.032***</b> (0.008)	<b>0.031***</b> (0.010)		
External change * low paid			<b>0.065***</b> (0.013)	<b>0.067**</b> (0.020)			<b>0.061***</b> (0.011)	<b>0.062***</b> (0.014)
External change * medium paid			<b>-0.001</b> (0.010)	<b>-0.001</b> (0.013)			<b>0.002</b> (0.009)	<b>0.002</b> (0.010)
External change * high paid			<b>-0.033**</b> (0.016)	<b>-0.035</b> (0.021)			<b>0.010</b> (0.015)	<b>0.005</b> (0.019)
In-firm job change	<b>0.025***</b> (0.007)	<b>0.023***</b> (0.006)			<b>-0.008</b> (0.012)	<b>-0.005</b> (0.010)		
In-firm change * low paid			<b>0.051***</b> (0.014)	<b>0.054**</b> (0.018)			<b>-0.023</b> (0.024)	<b>-0.017</b> (0.025)
In-firm change * medium paid			<b>0.008</b> (0.008)	<b>0.007</b> (0.007)			<b>-0.004</b> (0.015)	<b>-0.000</b> (0.012)
In-firm change * high paid			<b>0.012</b> (0.011)	<b>0.011</b> (0.010)			<b>-0.024</b> (0.017)	<b>-0.029*</b> (0.015)
Constant	<b>0.801</b> (0.817)	<b>0.412</b> (2.306)	<b>0.245</b> (0.736)	<b>0.235</b> (2.169)	<b>0.346***</b> (0.106)	<b>1.334***</b> (0.155)	<b>0.200**</b> (0.094)	<b>0.121</b> (0.164)
$R^2$	<b>0.006</b>	<b>0.036</b>	<b>0.196</b>	<b>0.196</b>	<b>0.014</b>	<b>0.019</b>	<b>0.223</b>	<b>0.220</b>

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

The list of the control variables is the same as in the first step regression.

Reference categories in brackets